Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Polydopamine Nanotubes-Templated Synthesis of TiO_2 and Its Photocatalytical Performance under Visible Light

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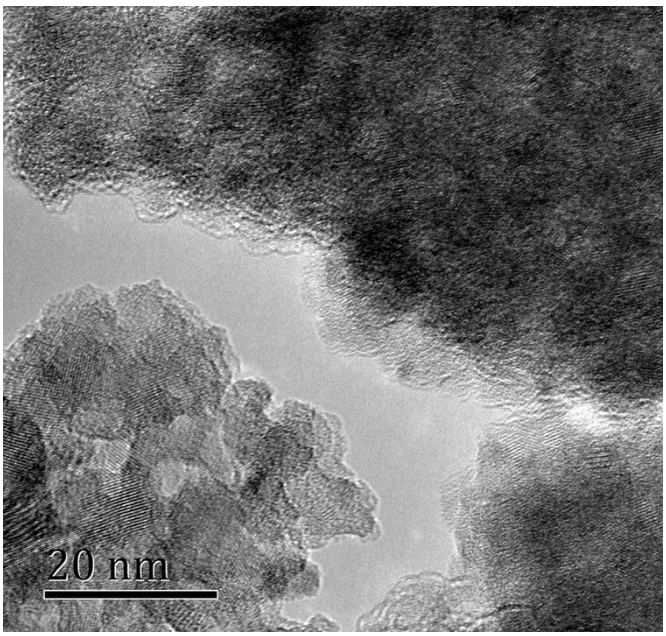

Fig. S1 HRTEM image of TiO_2@C-PDA (400-1).

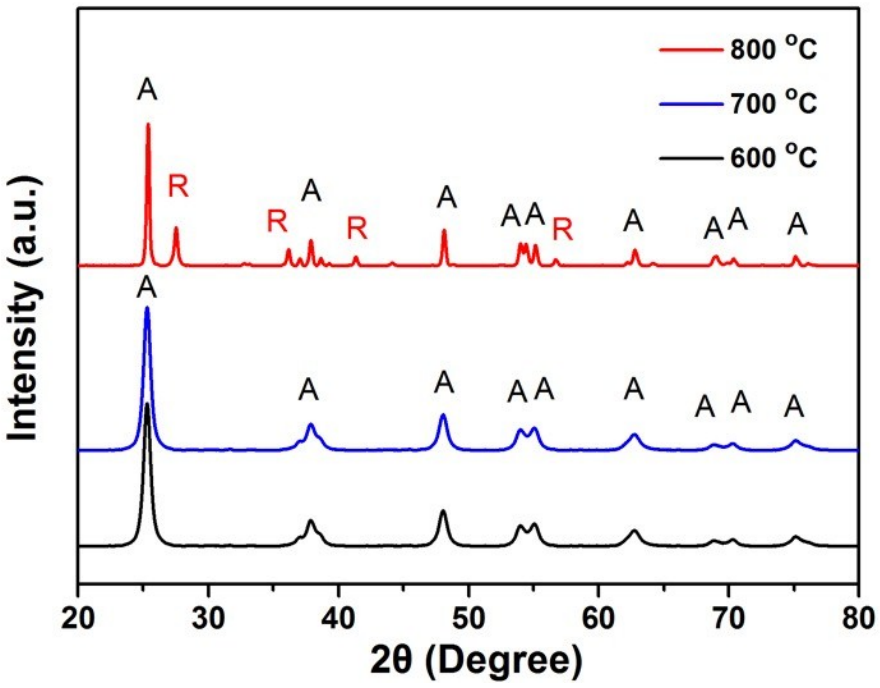

Fig. S2 X-ray diffraction patterns of TiO_2@PDA carbonized in argon for 3 hours at different temperatures, 600 (black line), 700 (blue line), 800 °C (red line). The temperature required for phase conversion of TiO_2@PDA is up to 800 °C that indicates the high phase stability of TiO_2@PDA hybrids.

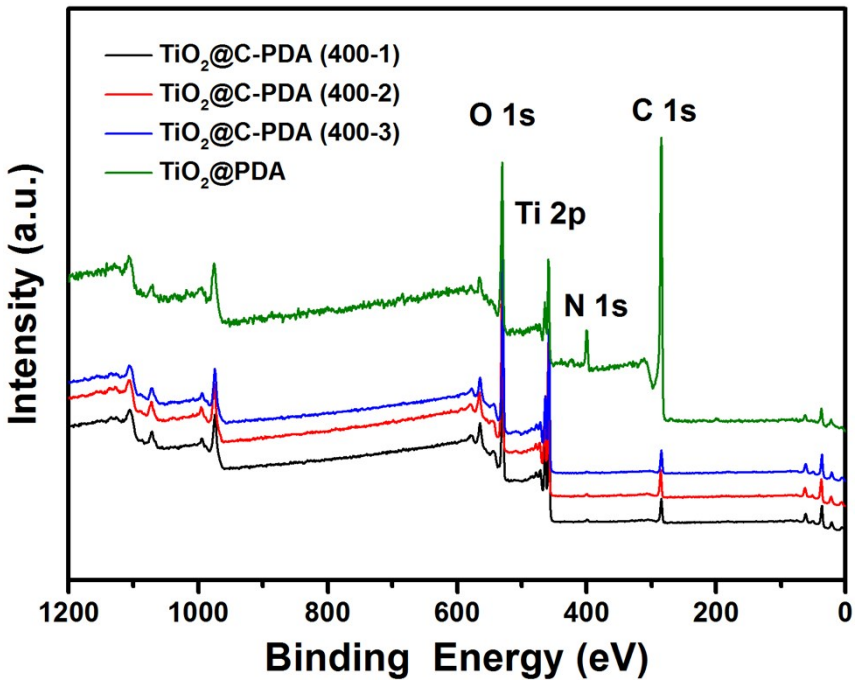

Fig. S3 XPS spectra of TiO_2@PDA and TiO_2@C-PDA (400-1,2,3) samples.

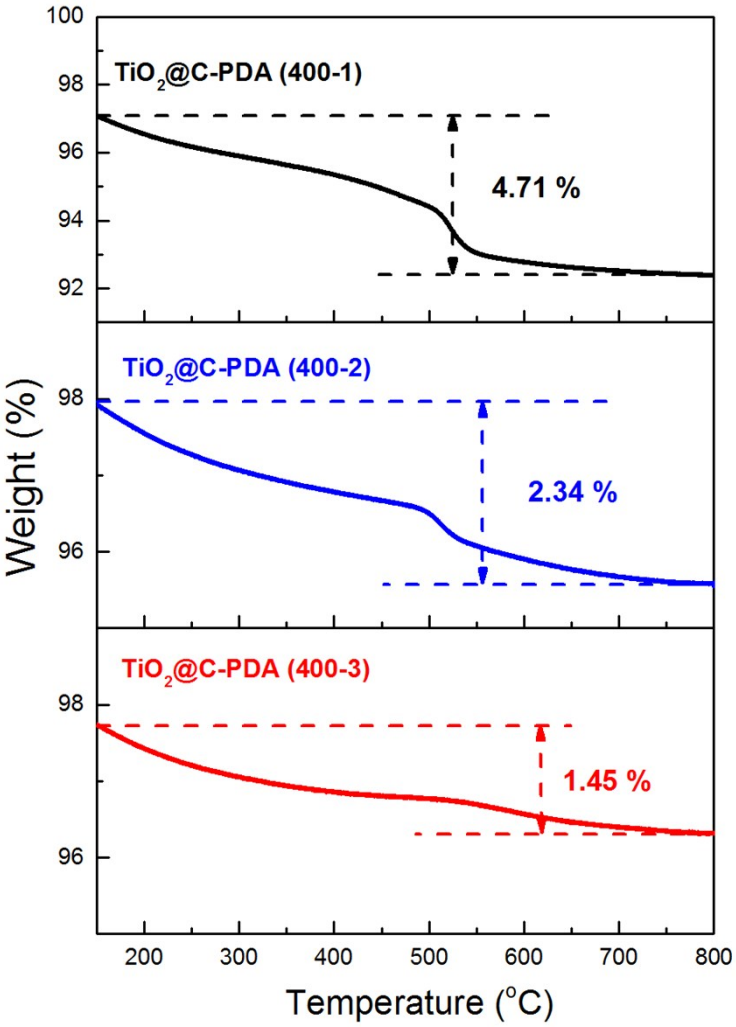

Fig. S4 Thermogravimetric (TGA) curves of TiO_2@C-PDA (400-1), TiO_2@C-PDA (400-2) and TiO_2@C-PDA (400-3) collected under air condition. Below 150 °C, mass loss was caused by dehydration from the samples. The calculation range is from 150 to 800 °C, which is related with the release of nitrogen and carbon. Weight ratio of carbon (W_{carbon}) can be calculated through the following equation: Weight loss = $W_{carbon} + W_{nitrogen}$. The amount of doped nitrogen in the TiO_2@C-PDA (400-1,2,3) samples was calculated from the XPS data. Therefore, we can conclude that the contents of carbon cover layer in the TiO_2@C-PDA (400-1,2,3) samples are 3.80 wt%, 1.60 wt%, 1.09 wt%, respectively.

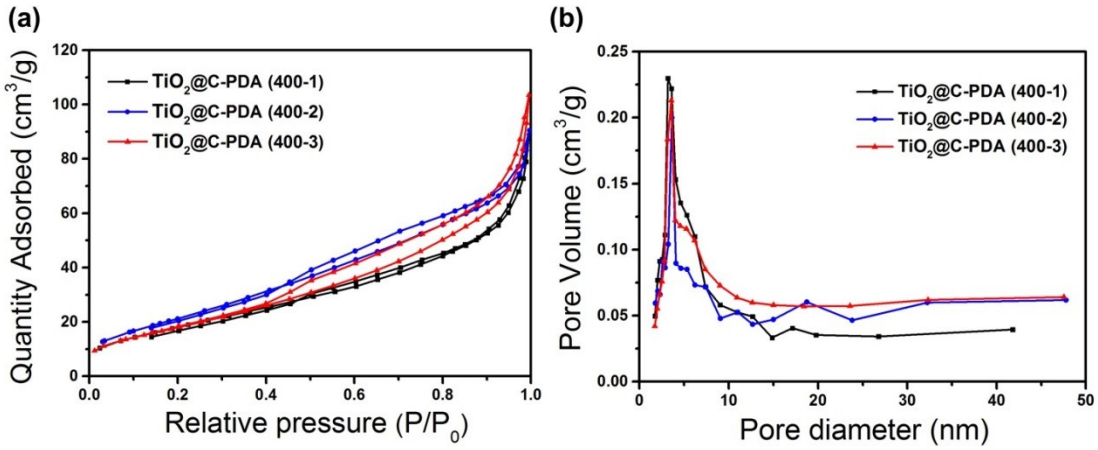

Fig. S5 (a) N_2 adsorption–desorption isotherms and (b) the BJH corresponding pore size distribution curves of TiO_2@C-PDA (400-1, 2, 3).

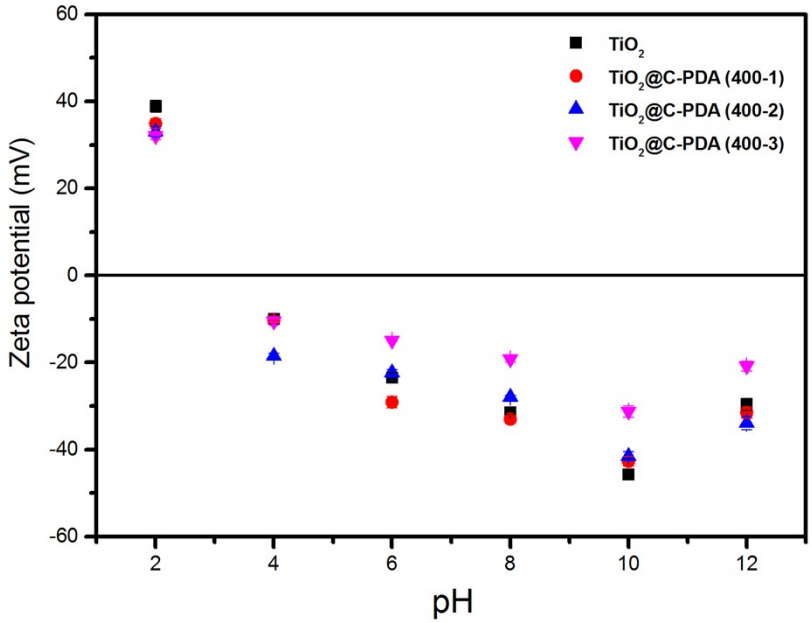

Fig. S6 Zeta-potential of TiO_2 and TiO_2@C-PDA samples dispersed in aqueous solution with different pH values.

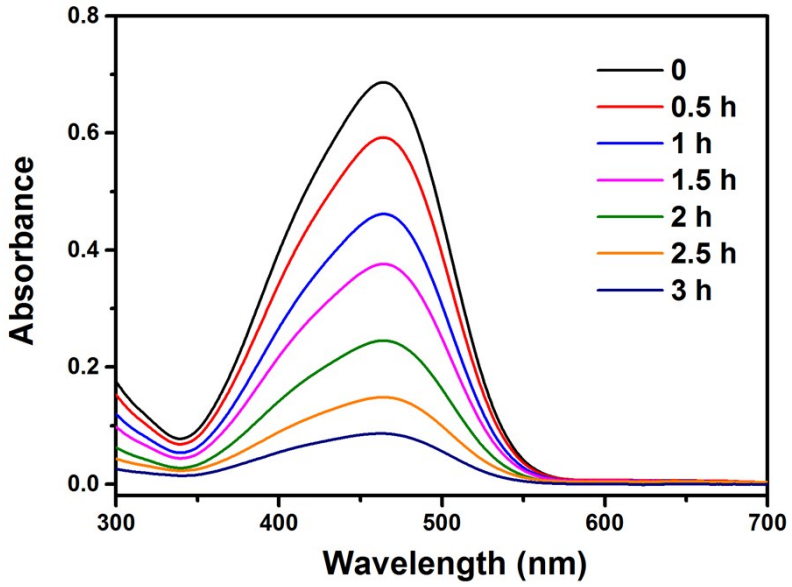

Fig S7. UV-Vis spectra of MO in the presence of TiO_2@C-PDA (400-2) under visible light irradiation ($\lambda > 420$ nm).

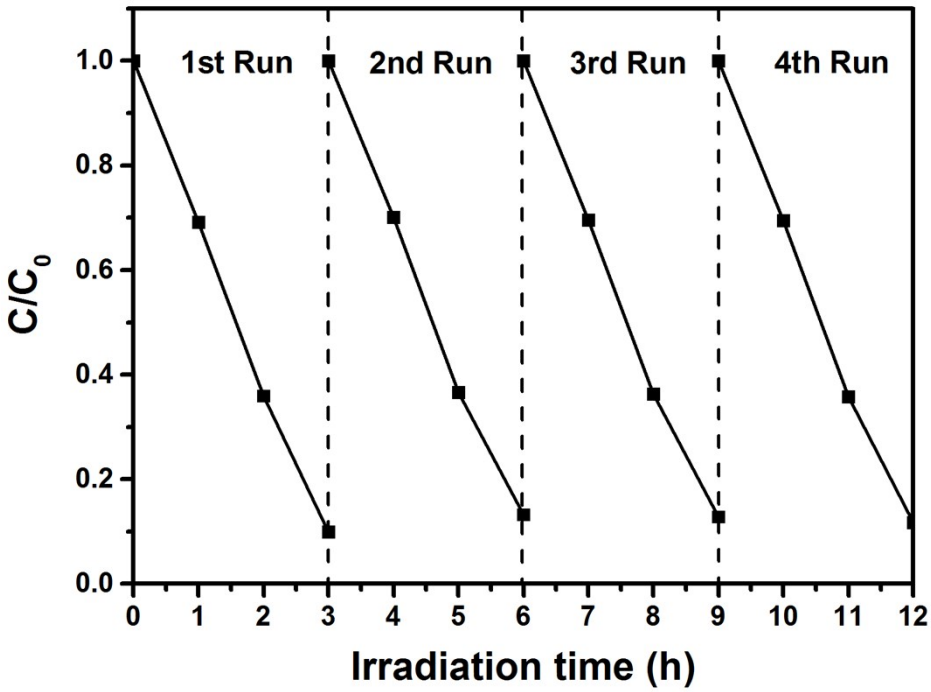

Fig S8. Cycling use of TiO_2@C-PDA (400-2) for photocatalytic degradation of MO.

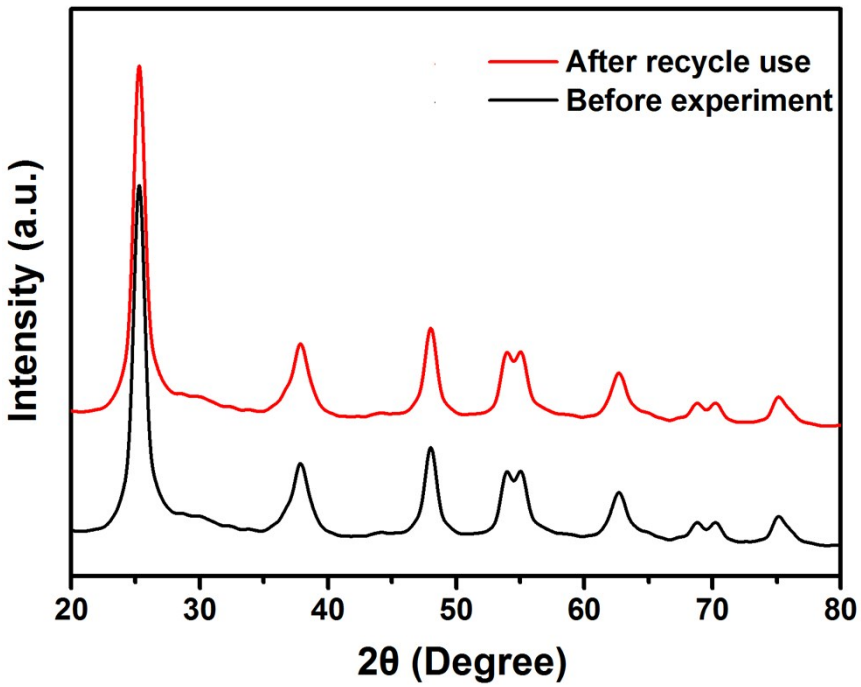

Fig S9. X-ray diffraction patterns of TiO_2@C-PDA (400-2) before (black line) and after (red line) photocatalytic experiments.

Table S1 Quantitative atomic ratios of all elements obtained from XPS analysis.

Samples	C (at%)	N (at%)	Ti (at%)	O (at%)
TiO_2@ PDA	69.44	8.93	5.86	15.77
TiO_2@C-PDA (400-1)	20.73	1.54	26.32	51.42
TiO_2@C-PDA (400-2)	21.11	1.24	25.43	52.21
TiO_2@C-PDA (400-3)	19.50	0.61	27.27	52.62